

UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

DAVID SETH WORMAN, ANTHONY LINDEN,
JASON WILLIAM SAWYER, PAUL NELSON
CHAMBERLAIN, GUN OWNERS' ACTION
LEAGUE, INC., ON TARGET TRAINING, INC.,
AND OVERWATCH OUTPOST,

Plaintiffs,

v.

MAURA HEALEY, in her official capacity as
Attorney General of the Commonwealth of
Massachusetts; DANIEL BENNETT, in his official
capacity as the Secretary of the Executive Office of
Public Safety and Security; and COLONEL
KERRY GILPIN, in her official capacity as
Superintendent of the Massachusetts State Police,

Defendants.

CIVIL ACTION

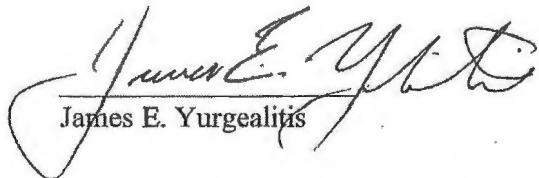
NO. 17-10107-WGY

Declaration of James E. Yurgealitis

I, James E. Yurgealitis hereby depose and state:

1. I am over the age of 18 and am competent to testify to the matters stated below based on personal knowledge.
2. I have attached a copy of my expert report that was previously disclosed in this matter, dated September 20, 2017. The contents of my report are true and correct to the best of my knowledge and belief. I hereby adopt and incorporate my report in this declaration as if set forth in full.

I declare under penalty of perjury on this 13rd day of December, 2017 that the foregoing is true and correct.



James E. Yurgealitis

REPORT OF JAMES E. YURGEALITIS

I. PERSONAL BACKGROUND AND QUALIFICATIONS:

1. I am currently self-employed as a Legal and Forensic Consultant, providing firearms related technical and public policy consulting, testing and training services to corporations, legal counsel, and the public sector. A detailed description of my work experience, education, and training are included in my Curriculum Vitae, which is attached as Exhibit A to this report. I have also included, as Exhibit B, a statement of my qualifications as an expert witness in the areas relevant to my experience.
2. I am a former Senior Special Agent/Program Manager for Forensic Services for the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), U.S. Department of Justice, a position I held for nine years prior to my retirement. In that capacity, I was responsible for all ATF firearms and forensic firearms related training and research at the ATF National Laboratory Center (NLC) in Ammendale, MD.
3. Prior to my tenure at the ATF NLC, I was employed as a federal law enforcement officer, in various capacities, for approximately 16 years.
4. As detailed in Exhibits A and B, I have extensive training and experience with respect to firearms in general, as well as their history, manufacture, operation, and use.
5. I have been retained by the Office of the Massachusetts Attorney General to provide research and opinions related to the Commonwealth's Assault Weapons ban, M.G.L. s. 140, sections 121, 123 clause 16, and 131M. More specifically, I have been asked to provide information and opinions about the banned weapons, their history and their uses, as well as about firearms that are potentially copies or duplicates of the weapons that are enumerated in the definition of "Assault Weapon" contained in M.G.L., section 121.

6. I have been provided with, and have reviewed, copies of documents filed in this case which I have referenced in doing this work. These documents are listed in my bibliography.

7. I have also reviewed current firearms statutes and regulations relative to the transfer and possession of firearms within the Commonwealth of Massachusetts.

8. I am being compensated at a rate of \$225 per hour for my work on this Report; my rate to provide expert testimony is \$275 per hour, with a four-hour minimum.

9. I have also reviewed numerous materials, periodicals, publications, corporate websites and documents in furtherance of my research and in formulation of my opinion(s) in this case. To further illustrate my opinions, I may rely on photographic and / or video images during any deposition and any subsequent testimony. A listing of the materials I specifically reference in this report are included in my bibliography.

II. GENERAL FIREARMS TERMINOLOGY AND OPERATION

10. In discussing modern firearms, it is important to understand how they are defined under statute, how they function and the differences between types commonly available to the public.

11. As demonstrated in the following two paragraphs, gun related terminology and usages may vary significantly, particularly in connection with legal definitions adopted in various jurisdictions.

12. Under the General Laws of the Commonwealth of Massachusetts, Chapter 140, Section 121, a Firearm is defined as:

"Firearm", a pistol, revolver or other weapon of any description, loaded or unloaded, from which a shot or bullet can be discharged and of which the length of the barrel or barrels is less than 16 inches or 18 inches in the case of a shotgun as originally manufactured; provided, however, that the term firearm shall not include any weapon that is:

- (i) constructed in a shape that does not resemble a handgun, short-barreled rifle or short- barreled shotgun including, but not limited to, covert weapons that resemble key-chains, pens, cigarette-lighters or cigarette-packages; or (ii) not detectable as a weapon or potential weapon by x-ray machines commonly used at airports or walk-through metal detectors.

13. By contrast, under Federal Law, 18 U.S.C section 921(a)(3) a Firearm is defined as:

- (A) Any weapon (including a starter gun) which will or is designed to or may readily be converted to expel a projectile by the action of an explosive; or
- (B) the frame or receiver of any such weapon; or
- (C) any firearm muffler or firearm silencer; or
- (D) any destructive device.

Such term does not include an antique firearm, as defined in Section 921 (a) (16), e.g. an antique ignition system firearm (e.g., matchlock, flintlock, percussion cap, etc.); or a firearm made in or before 1898, etc.”

14. In using relevant nomenclature throughout this report, I will adopt the Massachusetts legal definitions wherever applicable, except that I refer to all guns as “firearms” consistent with federal law. I will define and explain other relevant terms in this and the following section.

15. Modern Firearms (as defined by federal law) operate utilizing the expanding gases generated by the rapidly burning gunpowder contained in modern ammunition. Gunpowder (or smokeless powder) is the propellant contained within metallic cartridges or shotshells utilized by modern firearms. A single cartridge or shotshell is also referred to as a “round” of ammunition. Once chambered or loaded in a modern firearm, and the trigger is pulled, the primer at the base of the cartridge or shotshell is struck by a firing mechanism. The primer contains a pressure sensitive explosive compound which ignites when struck. The ignition of the primer, in turn, ignites the main powder charge contained in the case of the cartridge or shotshell.

The main powder charge ignites and burns rapidly in what is essentially a contained explosion.

16. This contained explosion generates gases at enormous pressures. The generated gases push the projectile out of the mouth of the cartridge, down the barrel of the firearm and out of the firearm through the muzzle.

17. More simply defined, a firearm is a weapon which utilizes the gas pressure generated by the burning gunpowder (explosive) in a modern ammunition cartridge to propel a projectile through the barrel and out of the firearm through the muzzle.

18. All modern Breech loading firearms, no matter the type, operate according to a nine step process known as the "Cycle of Fire". The Association of Firearm and Toolmark Examiners (AFTE) is a professional organization for Forensic Firearm and Toolmark Examiners which, in conjunction with the U. S. Department of Justice (USDOJ), National Institute of Justice (NIJ), has created a training program for apprentice forensic firearm and toolmark examiners. As these steps will be referenced throughout this report they are included here for reference.

The AFTE training program has outlined the nine steps of the Cycle of Fire as:

1) Feeding:

Feeding refers to the process for insertion of cartridges into the chamber; the breech bolt pushes the cartridge into final position. Typically, the incoming round slides across the bolt or breech face during this camming action. The feeding function can be manual or performed by various kinds of magazines and clips. For example, machine guns use belts of cartridges.

2) Chambering:

Chambering is the insertion of the cartridge into the chamber. If a cartridge of the incorrect length or diameter is used or if there is foreign matter in the chamber, chambering may be obstructed, causing a malfunction. Excess oil or grease in the chamber may cause overpressure, resulting in a ruptured cartridge case and potentially serious accidents.

3) Locking:

The breech bolt mechanism locks the cartridge into position in the barrel before firing. Most quality firearms are equipped with an interrupter mechanism that disconnects the trigger from the firing pin, thus making it impossible to fire until the mechanism is safely locked. This critical relationship is referred to as timing. (Blowback mechanisms involve a spring-held bolt; the mechanism is not technically locked, it is held together by spring tension and bolt inertia.) The locking principle is easily demonstrated by closing a high-velocity .30 caliber bolt-action rifle. When the bolt is turned down at the end of its forward thrust, one or more lugs rotate into machined slots or against a shoulder in the receiver. This closure is essential; if the firing pin falls on the cartridge primer before the mechanism is safely locked, an accident may occur.

4) Firing:

When the breech is fully locked, a pull on the trigger mechanically translates to the firing pin release. In the cocked position, the firing pin has a hammer behind it with a spring forcing it towards the primer, restrained only by a sear that is engaged by the trigger. A pull on the trigger trips the sear from the engaging notch in the hammer. The hammer, actuated by a cocked spring, drives the firing pin sharply against the percussion sensitive primer, which fires the cartridge.

5) Obturation:

Obturation occurs when powder gases under high pressure (e.g., two and one-half tons per square inch in the .30 06 Springfield cartridge) are sealed to prevent them from jetting between primer cup and cartridge case, cartridge case and primer wall, and projectile and bore.

Cartridge cases must be sufficiently flexible to expand against the chamber wall and transmit the instantaneous powder pressure to the barrel metal that surrounds the chamber. When the chamber pressure has returned to zero, the cartridge case

must also be flexible enough to release itself from the chamber wall (even though it is now pressure form-fitted to the chamber).

Likewise, the primer cup has been held by pressure against the base of the cartridge case and depends upon the face of the breechblock for locked support during the interval of high chamber pressure. Obturation also occurs with the projectile; bullets are made sufficiently larger than the bore diameter to extrude into the rifling grooves and seal the gases. The sharp hammer action of the instantaneous high pressure and temperature may upset the projectile base, which enhances sealing. Shotgun wads perform the sealing function in smooth bore weapons.

6) Unlocking:

This is the reverse of the locking process and is frequently performed in conjunction with extraction.

7) Extraction:

Although cartridge cases do not commonly exceed their elastic limit during firing, they have a tendency to stick to the chamber after firing. After firing, cartridge cases are larger in diameter than before firing. If the fired cartridge case is intended for reloading, it must be full length resized in a reloading die. All cartridge cases are designed with a rim or groove (cannelure) at the base so that an extractor claw can grasp this edge in order to achieve extraction.

8) Ejection:

In the final stages of extraction, the cartridge case encounters a projection that is usually at right angles to the exit portal of the breech. Rotating on the fulcrum of the extractor the case base is contacted on the opposite side by the ejector, which flips the case out of the actuating mechanism.

9) Cocking:

The hammer spring is usually cocked when the bolt of a rifle pistol, or repeater shotgun is retracted. An exception to this is the M1917 Enfield Rifle, which cocks upon forward motion of the bolt. Exposed hammers may be cocked by manual retraction, using the thumb. The Walther series of pistols provides for manual cocking or trigger pull cocking (double action), as do most open hammer revolvers.

19. Additional definitions often used when classifying firearms (in general) are Semiautomatic, Full Automatic and Select Fire:

a. Semiautomatic:

Refers to a repeating / self-loading firearm that fires one shot for each pull of the trigger until the ammunition supply is exhausted. The energy of the fired cartridge is utilized to cycle the mechanism of the firearm to feed and chamber the next shot.

b. Full / Fully Automatic:

Refers to a firearm that will continuously fire successive shots when the trigger is pulled, and will only stop when the trigger is released or the supply of ammunition is exhausted. Commonly referred to as a machine gun.

c. Select Fire:

A firearm capable of switching between and functioning in either full automatic or semiautomatic fire mode. Alternatively, some firearms can fire in “burst mode” meaning automatically with a mechanical limitation on the number of shots.

20. Additional definitions relevant to any discussion regarding firearms in general, and this report in particular, are Rifling, Caliber and Gauge.

a. Rifling:

Rifling refers to a series of grooves cut or impressed inside the barrel in a spiral pattern. The “high” portions of these patterns are called “Lands”. The “lower” portion of this pattern are called “Grooves”. When a projectile (or bullet) is fired in

a “rifled” firearm it comes into contact with the lands as it leaves the chamber and begins to travel down the barrel. Because the lands are oriented in a spiral pattern the rifling imparts a spin to the projectile which improves stability and accuracy.

b. Caliber:

Caliber is a dimensional measurement of the inside (or bore) of a rifled barrel. In the United States caliber is traditionally expressed in fractions of an inch. For example, a .22 caliber firearm is designed to chamber and fire a projectile which measures .22 inches (or slightly less than a quarter of an inch). A .50 caliber firearm chambers and fires a projectile which is approximately a half inch in diameter.

In Europe, and the majority of other countries utilizing the metric system, caliber has historically been expressed in millimeters (mm). Therefore, a 9mm firearm is designed to chamber and fire a projectile with a diameter of 9mm. European caliber designations may also include measurement of the length of the cartridge case (9x19mm, 7.62x39mm, etc.)

A number of firearm calibers widely manufactured have two separate caliber designations, one in inch measurements and one in metric, which are equivalent and interchangeable. For example, .380 caliber ammunition in the US is referred to as 9x17mm caliber in Europe.

It is important to note for the purposes of this report that the caliber designation of any given ammunition cartridge usually refers only to the diameter of the projectile (bullet) and not the relative “power” of the cartridge itself (in terms of muzzle energy, effective range and muzzle velocity). However, there is a distinction between cartridges commonly referred to as .22 caliber and cartridges commonly referred to as .223 caliber.

.22 caliber ammunition is a popular and relatively low power cartridge developed in the 1880’s. It is also known as “.22 rimfire” as the primer mixture in the cartridge is seated in the rim of the cartridge. It is commonly used for target shooting as well as hunting small game and can be fired from both handguns and rifles chambered in that caliber. Bullet weights for .22

caliber projectiles / bullets are typically between 30-60 grains (0.08 to 0.13 ounces). Muzzle velocities are usually in the 1100-1300 feet per second (fps) range. Below is a table from Remington Ammunition illustrating the specifications of their .22 standard velocity cartridge:

22 RIMFIRE SPECIFICATIONS							R					
Rimfire Magnum	LR Hyper Velocity	LR Short High Velocity	LR High Velocity	LR Standard Velocity	LR Subsonic	LR Low Noise						
CARTRIDGE	INDEX / EDI NO.	WEIGHT (GR)	BULLET STYLE	VELOCITY (FT/PS)	MUZZLE	50	100	MUZZLE	50	100	150	TRAJECTORY (IN)
Target	6122/6100 111	40	Round Nose	1150	1048	976	117	98	85	0.2	0	-6.4

* Sight height 1.5" above axis of bore. **Available in 500-round bulk pack.

<https://images.remington-catalog.com/5751b2165394d>

.223 caliber ammunition by comparison is a high velocity cartridge developed in the 1950's in part for use in the original AR-15 and M-16 rifles. It is a "centerfire cartridge." Although the diameter of the projectile / bullet is only slightly greater (approximately the width of a human hair) than the .22 caliber cartridge mentioned previously, it is a vastly more powerful cartridge in terms of muzzle velocity and range. This caliber ammunition is also known by its metric designation 5.56mm. Here is a side by side comparison of .22 (left) and .223/5.56mm caliber cartridges (right) with a penny between for size reference:



Common bullet weights for .223 / 5.56mm caliber projectiles are 50 to 62 grains + or – (0.11 to 0.14 ounces) and common muzzle velocities are approximately 3,200 to 3,500 feet per second. A heavier bullet and increased velocity equates to more of the cartridge's energy being transferred to the target. The National Rifle Association (NRA) American Rifleman Magazine tested the U.S. Army's new .223 caliber cartridge (M855A1) in 2014 and the results are published here:

<https://www.americanrifleman.org/articles/2014/5/21/testing-the-army-s-m855a1-standard-ball-cartridge/>

For comparison with the .22 cartridge, here is the Remington Factory ballistics chart for their commercial .223 offerings:

PREMIER® ACCUTIP CALIBERS & BALLISTICS										
CALIBER	B/DEX / EDI NO.	WEIGHT (GR)	BULLET STYLE	PRIMER NO.	BALLISTIC COEFFICIENT	MUZZLE	VELOCITY (FT-PS)			
							100	200	300	400
.17 Remington FireBall®	PRA17FB	20	AccuTip™	7 1/2	0.185	4000	3380	2840	2360	1930
.17 Remington	PRA17RA	20	AccuTip™	7 1/2	0.185	4250	3594	3028	2529	2081
.204 Ruger	PRA204A	32	AccuTip™	7 1/2	0.21	4225	3632	3114	2652	2234
	PRA204B	40	AccuTip™ Boat Tail	7 1/2	0.275	3900	3481	3046	2677	2336
.22 Hornet	PRA22HNA	35	AccuTip™	6 1/2	0.109	3100	2271	1591	1127	924
.221 Remington Fireball	PRA221FB	50	AccuTip™ Boat Tail	7 1/2	0.238	2995	2605	2247	1918	1622
.222 Remington	PRA222RB	50	AccuTip™ Boat Tail	7 1/2	0.242	3140	2744	2380	2045	1740
.223 Remington	PRA223RB	50	AccuTip™ Boat Tail	7 1/2	0.242	3410	2989	2605	2252	1928
	PRA223RC	55	AccuTip™	7 1/2	0.255	3240	2854	2590	2172	1871

<https://images.remington-catalog.com/568993448fdb4>

c. Gauge:

Gauge is a dimensional measurement which is traditionally used to denote the bore of a non-rifled or “smoothbore” firearm (i.e. a Shotgun). Shotguns were initially designed to fire a mass of round shot as opposed to one solid projectile and therefore, a caliber designation is not readily applicable. Gauge refers to the number of lead spheres which will fit inside the bore and equal one pound. For example, in a 12-gauge shotgun you can fit 12 spheres of lead, which are approximately 18.52mm or .73 inches in diameter, the total weight of which will equal one pound. If the diameter of the spheres is increased, it will require less of them to equal one pound. Therefore, the smaller the “gauge,” the larger the

dimension of the bore. The exception to this measurement system is the .410 gauge shotgun which is actually a caliber designation.

III. TYPES OF MODERN FIREARMS

21. Modern firearms as currently manufactured for civilian ownership fall into two general types: Handguns and Long Guns (or shoulder weapons).

Handguns:

Handguns are generally defined as a firearm having a short stock (grip), and are designed to be held, and fired, with one hand. The term "Handgun" defines two distinct types of modern firearms, the revolver and the pistol. (Massachusetts law uses the term "Firearm" to denote handguns as discussed above.)

A revolver is a handgun designed and manufactured with a revolving cylinder to contain, chamber and feed multiple rounds of ammunition. In a modern double action revolver, pulling the trigger rotates the cylinder bringing an unfired cartridge of ammunition in line with the barrel and firing pin. Pulling the trigger also cocks the hammer and then releases it either directly (or indirectly via a firing pin) to strike the primer of the cartridge initiating the firing sequence as stated previously. In this type of revolver, the trigger must again be pulled to rotate the cylinder in order to fire another cartridge. When all cartridges have been fired, the cylinder is unlocked from the frame and swings out to facilitate removal of expended cartridge casings and insertion of unfired cartridges. The cylinder is then closed and relocked within the frame and the handgun is again ready to fire when the trigger is pulled.

A pistol is a handgun designed and manufactured with the firing chamber as an integral part of the barrel and utilizes a "box" magazine to contain and feed multiple rounds of ammunition. In this type of handgun, generally, the box magazine is inserted into the firearm, the slide or bolt is pulled back and released which springs forward and feeds a cartridge into the chamber. When the trigger is pulled a firing pin or striker is released which impacts the primer of the cartridge

and initiates the firing sequence of the ammunition. In most pistols a portion of the recoil or gas pressure generated by firing the cartridge is utilized to move the slide rearward, extract and eject the expended cartridge case and chamber another round from the magazine. This sequence can be repeated by pulling the trigger once for each shot. The pistol can then be reloaded by removing the empty magazine and inserting a loaded magazine (or refilling a permanently affixed magazine if the pistol is so configured).

A Single Shot Pistol refers to a handgun which has no internal magazine capacity and requires the operator to manually reload the firearm after each shot fired.

Long Guns / Shoulder Weapons:

In terms of modern firearms manufacture Long Guns are generally of two distinct types: rifles and shotguns.

A rifle is a firearm which is designed and intended to be fired from the shoulder. It fires a single shot through a rifled bore for each pull of the trigger.¹ A shotgun is a firearm which is also designed and intended to be fired from the shoulder. It fires either a number of ball shot (commonly termed “buckshot” or “birdshot”) or a single projectile (commonly termed a “slug”) through a smooth (non-rifled) bore for each pull of the trigger.

a. Rifles:

Historically speaking rifles are the oldest type of firearms in existence. In terms of “types” of rifle, there are numerous variations. All of these variations, generally speaking, are defined and distinguished by the way they are loaded and reloaded. For example, single shot rifles fire one shot for each pull of the trigger. They have no internal or external magazine capacity and must be reloaded with a new unfired cartridge by hand for each shot. Many of these have a hinged or “break open” receiver to facilitate loading and unloading.

¹ Machine guns (any firearm with the capacity to fire more than one shot with each pull of the trigger) are defined separately for the purposes of state and federal law.

A Pump Action Rifle requires the operator to manually manipulate a forearm piece which is traditionally found underneath the barrel. After firing the forearm is pulled backward which unlocks the bolt, extracts and ejects the fired cartridge case. Pushing the slide forward feeds an unfired cartridge from the magazine, cocks the firearm mechanism and locks the bolt for a successive shot. Pump action rifles have been manufactured with both tubular and detachable box magazines.

Bolt Action Rifles require the operator to manually manipulate the bolt of the rifle. After firing, the bolt is first unlocked from the chamber and then moved rearward. This action also extracts and ejects the expended cartridge case. The bolt is then moved forward which feeds an unfired cartridge from the magazine into the chamber. Once the bolt is then again locked by the operator, it is ready to fire. Bolt action rifles usually have an internal fixed magazine or tubular magazine which will facilitate reloading via manipulation of the bolt until that capacity is exhausted. Bolt action rifles were generally the choice of military forces, hunters and sportsmen through the end of World War II.

A lever action rifle is similar to the bolt action rifle in that the operator is required to manipulate the mechanism, or “action”, of the firearm. A lever at the bottom of the receiver of the rifle is manipulated in an up and down motion in order to unlock the bolt and move it rearward, extract and eject the expended cartridge case, feed an unfired cartridge into the chamber and lock it. The operator’s action is required for each shot fired through the rifle. Generally speaking, lever action rifles are manufactured with tubular magazines which will vary in capacity depending on the caliber of the firearm.

A semiautomatic rifle utilizes the energy generated by the firing of the cartridge to power the cycle of fire. This is accomplished by siphoning off a portion of the gases generated by firing to operate the mechanism or by utilizing the recoil generated by firing much as in a semiautomatic pistol as described previously. Once loaded, the operation of this cycle of fire is not dependent on the operator to effect any portion of the process other than to pull the trigger. Semiautomatic rifles are, and have been previously, manufactured with both fixed internal magazines and a capacity to accept detachable external magazines. As such this type of rifle is capable of firing with each pull of the trigger until the supply of ammunition is exhausted. As stated previously, the majority of military firearms

until the end of World War II were bolt action. The exception to this rule was the United States entering the war with the semiautomatic M1 (Garand) .30-06 caliber rifle as standard issue. The Garand had a fixed internal magazine with an eight round capacity. As discussed below, since the end of World War II, virtually every military organization across the Globe has adopted a form of semiautomatic or select fire rifle, from among one of a series of designs.

b. Shotguns

Modern shotguns, as stated previously in regard to rifles, are generally classified and characterized by their operating system (i.e. the manner in which they function, are loaded and reloaded). Shotguns with multiple barrels are defined by placement or orientation of their barrels.

Single Shot Shotguns function similarly to the single shot rifle. They may have a hinged receiver which allows the operator to open the action at the chamber area to facilitate loading and unloading of the firearm. There are also single shot models that are loaded and unloaded through a bolt action mechanism and have no additional magazine capacity.

Bolt Action shotguns are manufactured, as stated above, as single shot, or with internal or detachable magazines to facilitate easier and faster reloading. They function in the same way as a bolt action rifle and require manual manipulation of the bolt by the operator to unload and reload.

Lever Action Shotguns, again function in the same fashion as a similarly designed rifle. Manual manipulation of the lever is required for successive shots.

Pump Action Shotguns have the same general operating system as a similarly designed rifle. The “action” of the shotgun must be worked forward and back by the operator to unlock the bolt, extract and eject the expended shotgun shell, reload and relock the bolt for firing.

Semiautomatic Shotguns, as with their rifle caliber counterparts, utilize energy (either recoil or gas pressure) generated by firing ammunition to “power” the operating system of the firearm. These are manufactured with a number of different magazines, both internal and fixed, as well as external and detachable.

They are capable of firing a single shot with each pull of the trigger until the supply of ammunition in the magazine is exhausted.

Break Open, Double Barrel and “Tip Up” Shotguns have a hinged receiver which facilitates access to the rear of the chamber for unloading and reloading. They are manufactured in single shot and double barrel variations. Double barrel variations are further delineated by the placement of their barrels. Side by Side Shotguns have two barrels situated next to one another in a horizontal arrangement. Over and Under Shotguns have two barrels superimposed upon one another in a vertical plane. The mechanisms in each of these allow staggered firing of each of the two barrels with a separate pull of the trigger. When the hinged action is opened the expended shotgun shell hulls can be manually extracted although more complex designs with auto ejectors perform that function when “opened” without action by the operator.

22. Other Types of Firearms:

There are additional types and classifications of firearms not discussed at length here, for brevity and because they are less relevant to my opinions. For example, a “Drilling”, a type of weapon prevalent in Europe consists of a shotgun and rifle mounted to the same receiver. Other types of firearms such as smoothbore revolvers, Short Barreled Shotguns, Short Barreled Rifles and Machineguns are regulated by ATF under the auspices of the National Firearms Act (NFA). Manufacture, transfer and ownership of these “NFA Firearms” is subject to more stringent regulations that include registration in a Federal Database.

IV. DEVELOPMENT OF ASSAULT WEAPONS / ASSAULT RIFLES

23. In recent years there has been an increase in the availability in the United States of semiautomatic rifles, pistols and shotguns with features initially designed (or patterned after those designed) for a military purpose. As the connection between these rifles and weapons designed for military use is intrinsically relevant to this case, it is important to discuss the history of the development and evolution of firearms with these features.

24. Although the terms “Assault Weapon” and “Assault Rifle” are not technical definitions akin to “Pistol” or “Rifle,” they have been statutorily defined

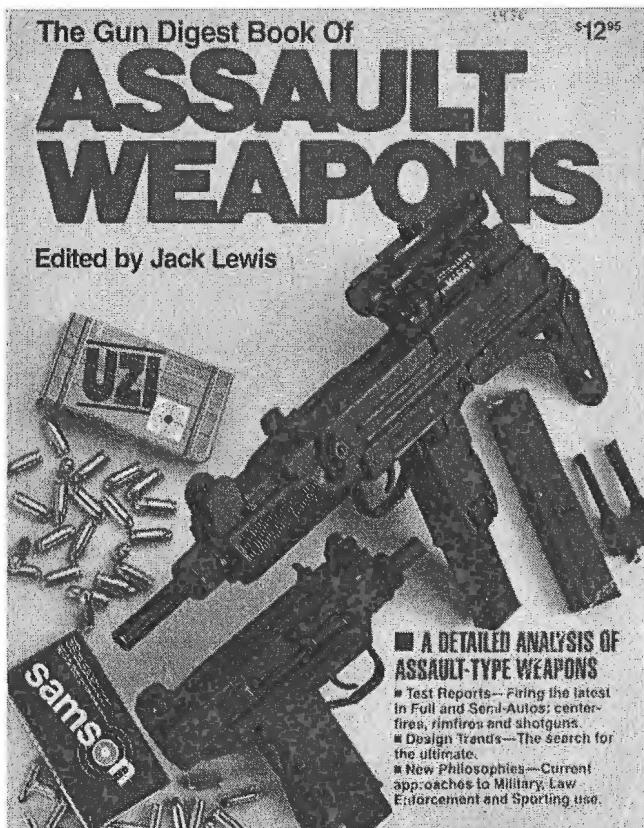
at the Federal, State and Local levels. In fact, the Plaintiffs err when stating in their complaint:

“Prior to 1989, the term “assault weapon” did not exist in the lexicon of firearms. It is a political term, developed by anti-gun publicists to expand the category of “assault rifles” so as to allow an attack on as many additional firearms as possible on the basis of undefined “evil appearance”. (*Worman Complaint*, paragraph 2.)

25. Contrary to the plaintiff’s claim of political contrivance, the term “assault weapon” had already entered popular / common use (to include the “lexicon” of firearms) as early as 1986 when the “Gun Digest Book of Assault Weapons” was first published. Edited by Jack Lewis the front cover states that it contains:

“A detailed analysis of Assault Type Weapons”

“Test Reports – Firing the latest in full and Semi Autos, centerfires, rimfires and shotguns”



Additionally, the July 1981 issue of "Guns and Ammo" Magazine featured as its cover a photograph of a WWII era German MP44 Sturmgewehr rifle (see #27 below) and a (then) current production Heckler Koch HK-91 semiautomatic rifle under the heading:

"The New Breed of Assault Rifle"



26. Assault Weapons have also been defined by statute at Federal, State and local levels. These particular definitions are, as in Massachusetts, dependent on these weapons' similarity to statutorily enumerated weapons and/or to particular features found on semiautomatic rifles originally designed and manufactured for use on the battlefield.

27. It is generally recognized that the first "Assault Rifle" or "Assault Weapon" is the German StG 44 (Sturmgewehr Model 1944) which appeared in production form late in WWII. Noted firearms historian and expert Ian Hogg referred to it as "The Father of all today's assault rifles."²

² "Military Small Arms of the 20th Century", 7th Edition", Hogg Ian V. and Weeks, John S., Krause Publications, Iola, WI, 2000, pp. 243.

Earlier pre-production variants included the MP 42 and MP 43 (Machinenpistol 1942 and 1943 respectively). The Germans termed the rifle “Sturmgewehr”, literally “Storm Rifle”, and a number of the features included utilization of a portion of the gas generated by the burning cartridge propellant to reload and operate the rifle, extensive use of steel stampings in its construction, a detachable magazine, a separate pistol style grip (not integrated with the shoulder stock), a bayonet mounting lug and a threaded barrel to facilitate the attachment of a grenade launcher. It fired a cartridge that was smaller dimensionally and less “powerful” (in terms of muzzle velocity and foot pounds of energy) than the standard 8mm Mauser cartridge in use by the German Army in their standard issue bolt action Mauser K98 rifles.

It is important to note that the features designed into the German StG 44 were intended to increase potential lethality in battle. In general, it is widely accepted that, in the design of military small arms, ‘form follows function’ and innovations primarily serve to increase the firepower and lethality of the individual combatant.

28. Following the end of the war, captured StG 44s were analyzed by the Allies, as well as the Soviets, and although there was reluctance to move to a smaller caliber cartridge a number of the features of the StG 44 found favor in the design of successive European, American and Eastern Bloc military rifles.

Noted firearm expert and historian Jim Supica wrote in his forward to the book “Guns”³

“Most military establishments hesitated to “downsize” the range and power of their primary rifles in the early Cold War years. The semi-auto detachable magazine concept was an obvious success and there was something to be said for full auto capability.”

He further writes:

“However the assault rifle concept wouldn’t go away. The Soviet Union accepted the lower power round idea in its fixed magazine semi-auto

³ Supica, Guns (TAJ Books, 2006), pages 26-28.

chambered for an intermediate power 7.62 x 39 mm round in 1945, the SKS, which saw wide distribution and production in Soviet client states.”

Two years later in 1947 the USSR followed the SKS with what Supica terms:

“The quintessential assault rifle – the Kalashnikov designed AK-47.”

29. The design of the AK-47 carried forward a number of the features introduced on the German StG 44. These features include a gas powered operating system, use of steel stampings in its construction, a separate pistol grip, separate shoulder stock, a detachable magazine, a bayonet lug and provision for attachment of a grenade launcher. Due to the separate stock and pistol grip, the AK, much like the StG 44, also utilized a barrel shroud at the forward third of the rifle. Some variations of the early AK-47's (AKM) also featured a compensator at the muzzle that deflected gas upward and to the right to “compensate” for the rifle's tendency to kick up and to the right with every shot.

30. In the 1950's numerous Nations sought to replace WWI and WWII vintage bolt action and semiautomatic rifles with these newer and more effective designs. With the birth of the North Atlantic Treaty Organization (NATO), however, utilization of Soviet Bloc AK or SKS Assault Rifles was not possible. Accordingly, a number of firearms manufacturers outside the Soviet sphere of influence developed military rifles which carried forward these same features to one extent or another. Fabrique Nationale (FN) of Herstal, Belgium and Heckler Koch (HK) of Oberndorf, Germany are two noteworthy examples.

31. FN developed the FN-FAL (Fusil Automatique Leger) and HK the G3 which found a ready market amongst nations that did not favor the Soviet AK type designs. Both incorporated features which, like the AK, were derived directly from the StG 44. Their designs featured some parts made from metal stampings as opposed to heavier and more expensive machined steel pieces. A separate pistol grip, shoulder stock, detachable magazine and barrel shroud followed the basic design of the StG 44. A flash hider and / or muzzle brake have appeared in production variations of both rifles. These rifles were destined from inception to become widely exported as the domestic market in both countries was relatively limited. The FN-FAL and G3 have been in production since the 1950's and both FN and HK have licensed production to numerous countries in South America, Africa and the Middle East.

32. By the late 1950's through the late 1960's most nations who could afford to do so had replaced early 20th century rifle designs with these newer and more effective rifles for their military forces.

33. In the United States, progress in this arena moved at a significantly slower pace. The prevailing wisdom here was to stay away from lighter, smaller rifle calibers and cartridges as the .30-06 cartridge used in the M-1 Garand Rifle during WWII had proven to be more than successful. Their initial answer to the burgeoning move towards Assault Rifles was a variation of the basic M-1 Garand operating system, the T44, or M-14. Outwardly, the M-14 retained a full length wood stock as did the Garand, however it featured a detachable magazine, select fire (both semiautomatic and full automatic) capability as well as a flash hider. It competed directly against the FN-FAL (designated T88) in U.S. Army trials and was selected in 1957.

34. In the mid 1950's, ArmaLite Corporation's chief engineer, Eugene Stoner, developed a number of lightweight assault rifle designs which resulted in the AR-10 in .308 caliber. Its design closely followed what was now becoming standard assault rifle design i.e. light weight (in this case aluminum forged receivers as opposed to machined steel), separate pistol grip and shoulder stock, foregrip / barrel shroud, detachable magazine, and numerous flash hider / muzzle brake variations.

35. ArmaLite continued to refine the basic design of the AR-10 which resulted in the AR-15. The AR-15 was designed to chamber and fire the 5.56 x 45mm cartridge (somewhat interchangeable with .223 Remington caliber). However, despite resistance to the smaller caliber and some initial reliability problems due to improper maintenance by operators, the rifle was adopted as standard issue by the US Army in the mid 1960's. The production of the rifle had been licensed to Colt and initially the model designation was, as produced, AR-15. Upon adaptation, the standard US military designation was changed to M-16. After some modifications, the rifle proved to be as reliable and accurate in Viet Nam as the AK type rifles deployed by the North Vietnamese and Viet Cong.

V. DEVELOPMENT OF PISTOL CALIBER ASSAULT WEAPONS

36. A submachine gun can generally be defined as a short or compact shoulder fired firearm which chambers and fires pistol caliber ammunition in select fire or Fully Automatic Mode.

37. Many of the construction and design features attributed to assault weapons, and the STG44, were first utilized in the design and manufacture of mid-20th Century submachine guns. Nazi Germany entered the war with the innovative MP38 (Maschinenpistole 38). It was chambered in 9mm and later, after several engineering changes, re designated the MP40. Its design features, later commonly found in assault weapons, included include an adjustable stock, separate pistol grip, a detachable magazine and use of steel stampings in its construction.

38. While the United States initially entered World War II with a military variant of the Thompson .45 caliber sub-machinegun, it was heavy and expensive to manufacture as a number of the major components were machined from solid steel. Before the end of the war the Thompson had been supplemented by the M3 "Greasegun" initially produced by General Motors. The receiver was a stamped and welded sheet metal assembly with an adjustable sliding shoulder stock. Like the MP38 / MP40 it had a separate pistol grip, a sliding / adjustable shoulder stock and a detachable box magazine with a 30 round capacity. In a utilitarian sense it was as effective as the Thompson and at approximately \$20, it was less than half as expensive for the US Government to purchase.

39. The United Kingdom produced over one million Sten Submachine guns during WWII. A rugged and reliable firearm made largely from welded steel stampings it was utility and ease of manufacture both combined and perfected. Features shared with the M3 and MP40 included an adjustable and / or collapsible shoulder stock, a detachable box magazine and, on some variations, a barrel shroud allowing the operator to utilize the area surrounding the barrel as an auxiliary grip point without coming into contact with a heated barrel.

40. Prior to and during WWII a number of other nations developed submachine guns which followed the same design and construction philosophy. Notable examples include the Soviet PPSH41, the Italian Beretta Model 38/42, and the Swedish Carl Gustav Model 45. Following WWII most new submachine gun designs continued the design philosophy which combined utility, ease of manufacture and the features of wartime firearms. In the early 1960's, HK introduced the MP5 which became an immensely popular choice for military and Law Enforcement agencies worldwide due to its inherent reliability and accuracy. It was produced in multiple iterations to include a semiautomatic civilian version as well as a pistol variant without a provision for a shoulder stock (HK SP89). Israeli

Military Industries also successfully marketed their UZI submachine gun for export in select fire, and in civilian semiautomatic variants.

41. Additionally, a number of submachine gun designs proved unsuccessful in terms of Military and Government sales but nonetheless found a ready market when marketed as a semiautomatic pistol. Notable examples include the Cobray MAC-10 (and successive variants) and the Intratec TEC-9 which began life as a Swedish designed submachine gun, the Interdynamic MP-9.

VI. DEVELOPMENT OF HIGH CAPACITY MAGAZINES:

42. The term “Large Capacity Magazine” (LCM) refers to any magazine with a capacity exceeding ten (10) rounds for semiautomatic handguns or rifles.

43. Modern semiautomatic rifles that are designed, manufactured and marketed as “hunting rifles” traditionally have an internal magazine capacity of less than 10 rounds depending on caliber.

44. High capacity magazines were not initially designed or intended for the civilian marketplace. The lineage of high capacity detachable magazines can be traced directly to a military heritage.

45. Magazine fed light machine guns developed or deployed prior to and during WWI, and thereafter refined, improved the capability and reliability of this type of feeding mechanism on a large scale. The ability to fire an increased quantity of cartridges without reloading increases the lethality and effectiveness of small arms in combat. Less time required to reload can equate to more time spent acquiring targets or shooting.

VII. PROLIFERATION OF THE AR & AK PLATFORMS:

46. Since the late 1950’s through the late 1960’s the move towards adoption of semiautomatic and select fire rifles by military forces became a global phenomenon. Soviet Bloc nations rearmed with AK type rifles (and their variants) while NATO Nations adopted a number of designs from Colt, HK and FN, as stated previously, around a standardized caliber rifle cartridge.

47. Several companies adapted these weapons, without changing their basic construction or design features, for civilian use. For example, in the early 1960's, Colt sought to capitalize on the military acceptance of the AR-15 / M-16 and began to produce rifles, incorporating the same construction techniques and configuration as the AR-15 for sale on the civilian market.⁴ The only difference between the Colt-produced military and civilian versions was removal of select fire capability and relocation of two assembly / disassembly pins in the lower receiver.

48. These civilian versions, including the Colt AR-15, retained the performance capacities of the military weapons they were based on, including the effective range, muzzle velocity and semiautomatic rate of fire. In addition, the weapons retained the capability to accommodate large capacity magazines (more than ten rounds) as originally issued for military use. As the AR-15 / M16 gained a reputation for reliability in Military use its popularity in terms of sales to the civilian market increased.

49. The exterior appearance of the first commercial Colt-produced civilian AR-15 was virtually identical to the M16 with only minor cosmetic changes in regard to markings and placement of a number of disassembly pins. The basic configuration of the rifle and the majority of the internal components were, and are, identical to and interchangeable with military production versions.

50. In the ensuing 40-plus years, both the military and civilian versions of the M16 / AR-15 platform have undergone numerous modifications both cosmetic and mechanical. Again however, the basic configuration, appearance, construction and operation of the internal gas operating system (as designed) has remained unchanged since its initial design and introduction as a military weapon.

51. The expiration of Colt's patents in the late 1970's naturally spawned competition in the marketplace. Throughout the design's lifespan many of the internal fire control components have remained unchanged and their specifications standardized industry wide. There are multiple internal parts that are completely interchangeable between military M16's manufactured in the 1960's by Colt and a AR-15 type rifle produced today by any one of hundreds of U.S. manufacturers who produce either receivers or internal operating parts. For example, a Bolt Carrier manufactured in 1967 by Colt will fit, and function as designed, in a AR copy manufactured in 2017. Additionally, the overall configuration of "copycat" AR

⁴ The Black Rifle II", Bartocci, Christopher R., 2004 Collector Grade Publications Inc., Coburg, Ontario, Canada pp. 233-237).

rifles remains identical to the original production design of the early 1960's. The overall design configuration (two piece hinged receiver (shown below), shoulder stock in line with the chamber and barrel, placement of the magazine, external switches and other features) are identical or nearly so.

52. Due to their modular construction AR type rifles are easily configured with parts made by other manufacturers to suit the owner's personal preference. The rifle receiver itself is designed as a two-piece unit and the "upper receiver" and "lower receiver" can be swapped out for other interchangeable pieces made by the same or another manufacturer with ease. The design also facilitates replacement of internal fire control components and assemblies:



https://howlingpixel.com/wiki/Colt_AR-15

53. Individual component pieces can be purchased allowing the individual to build a custom AR type rifle from the "ground up" as opposed to purchasing a

complete firearm due to the standardization and interchangeability of parts and subassemblies (under Federal Law the lower receiver of the AR platform is considered the “firearm” and requires a serial number. When purchasing a lower receiver (only) an individual is required to complete the same background check requirements as they would if purchasing a complete firearm. A good illustration of this ease of customization, and the plethora of interchangeable parts and accessories, is the fact that Brownell’s Inc., an established gun supply retailer in Iowa, currently offers a 104 page (11th edition) catalog of parts and accessories strictly for AR type rifles alone.

<http://www.brownells.com/GunTech/Brownells-Releases-AR-15-Specialty-Catalog-11/detail.htm?lid=17122>

Although Brownell’s release states there are “hundreds” of items in their 11th edition it is worthy of note that their “2nd AR Catalog”, when announced by the company, consisted of 68 pages and contained “more than 2,000 products” for AR type rifles:

<http://www.brownells.com/GunTech/Brownells-sup-174-sup-Releases-AR-15-Catalog-2-New-Catalog-Features-Products-Specific-to-America-8217-s-Most-Popular-Rifle/detail.htm?lid=11330>

54. The same holds true for AK type rifles available in the civilian market.

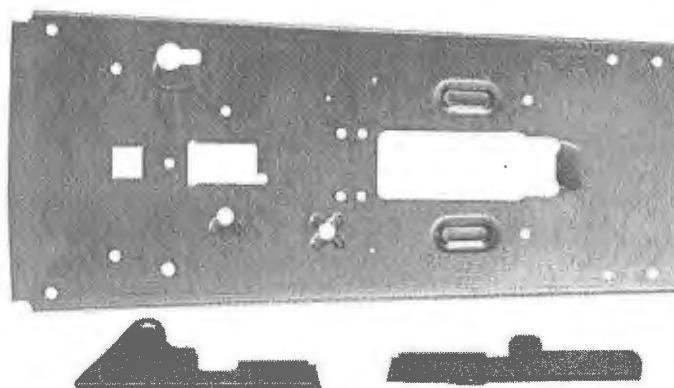
55. Although the design (and variants) of the AK-47 are more numerous than the AR type rifle (as far as military production and use is concerned), it lags behind the AR in regard to domestic civilian popularity. Nonetheless whether the AK Type rifle is of Russian, Chinese or other former Eastern Bloc manufacture, there is a robust secondary market in the United States for accessories, parts, sub-assemblies etc. Although not as easily modified as an AR style rifle due to its less “modular” design there are customization options available including a variety of shoulder stocks, sighting and illumination, etc.

56. Additionally, much as with AR type rifles, there are numerous vendors selling all the necessary component parts needed for an individual to build an AK style rifle from “the ground up” as opposed to purchasing a complete rifle and subsequently modifying the firearm. In actuality, the receiver of many AK rifles is simply a stamped metal “flat” which is available from numerous vendors including Brownells:



<http://www.brownells.com/rifle-parts/receiver-parts/receivers/rifle-receivers/ak-47-polish-underfolder-flat>

Virtually identical pieces are available from Midway U.S.A., a Columbia, MO firearm parts and accessories supplier:



<https://www.midwayusa.com/product/1016686155/gowear-custom-ak-47-flat-762x39mm-with-trunnion-holes-with-top-rail-bent-and-trimmed>

As these “flats” need to be bent into the correct configuration of the receiver numerous vendors also sell the needed “bending jigs” or fixtures to do so:

Midway:



<https://www.midwayusa.com/product/971924/power-custom-ak-47-flat-bending-fixture>

“Folded” receivers:



<https://www.atlanticfirearms.com/component/virtuemart/shipping-accessories/ak-47-receiver-side-folder-black-oxide-4-pack-detail.html?Itemid=0>

57. As with the AR, the general configuration and specifications of internal AK operating parts and assemblies have remained consistent. Regardless of the place of manufacture there are numerous internal fire control, feeding and gas operating system components that are interchangeable between AK rifles produced by manufacturers over the past 40-plus years. Again, as with AR type rifles, the overall

configuration of the AK rifle receiver, internal operating systems and their parts, and performance (in terms of semiautomatic rate of fire, muzzle velocity, range etc.) are comparable to the military versions from which they evolved.

58. As stated previously, the expiration of Colt's AR patent in the late 1970's spawned numerous "copycat" rifles from other vendors. A similar situation occurred with respect to AK type rifles on an international scale. These foreign manufacturers, Norinco (China), Romarm (Romania) and Valmet (Finland), were or still are state owned enterprises and tens of thousands of complete AK copies were imported into the U.S. by a number of foreign manufacturers before additional Federal regulation, Title 18, Section 922(r), required that a certain percentage of the rifle's parts be manufactured domestically.

59. Regulation of imports however has not slowed the demand for AK "copycat rifles" and numerous domestic manufacturers are producing rifles in the U.S. based on the original design and operating system.

VIII. PREVIOUS ASSAULT WEAPONS LEGISLATION

60. In September 1994 Congress passed, and President Clinton signed, the "Public Safety and Recreational Firearms Act" which was part of a larger omnibus crime reduction act. Commonly known as the Federal "Assault Weapons Ban" (AWB) the act banned the possession, transfer or importation of "semiautomatic assault weapons" defined as:

- (A) any of the firearms, or copies or duplicates of the firearms, known as--
 - '(i) Norinco, Mitchell, and Poly Technologies Avtomat Kalashnikovs (all models);
 - '(ii) Action Arms Israeli Military Industries UZI and Galil;
 - '(iii) Beretta Ar70 (SC-70);
 - '(iv) Colt AR-15;
 - '(v) Fabrique National FN/FAL, FN/LAR, and FNC;
 - '(vi) SWD M-10, M-11, M-11/9, and M-12;
 - '(vii) Steyr AUG;
 - '(viii) INTRATEC TEC-9, TEC-DC9 and TEC-22; and

‘(ix) revolving cylinder shotguns, such as (or similar to) the Street Sweeper and Striker 12;

(B) a semiautomatic rifle that has an ability to accept a detachable magazine and has at least 2 of--

- (i) a folding or telescoping stock;
- (ii) a pistol grip that protrudes conspicuously beneath the action of the weapon;
- (iii) a bayonet mount;
- (iv) a flash suppressor or threaded barrel designed to accommodate a flash suppressor; and
- (v) a grenade launcher;

(C) a semiautomatic pistol that has an ability to accept a detachable magazine and has at least 2 of--

- (i) an ammunition magazine that attaches to the pistol outside of the pistol grip;
- (ii) a threaded barrel capable of accepting a barrel extender, flash suppressor, forward handgrip, or silencer;
- (iii) a shroud that is attached to, or partially or completely encircles, the barrel and that permits the shooter to hold the firearm with the nontrigger hand without being burned;
- (iv) a manufactured weight of 50 ounces or more when the pistol is unloaded; and
- (v) a semiautomatic version of an automatic firearm; and

(D) a semiautomatic shotgun that has at least 2 of--

- (i) a folding or telescoping stock;
- (ii) a pistol grip that protrudes conspicuously beneath the action of the weapon;
- (iii) a fixed magazine capacity in excess of 5 rounds; and
- (iv) an ability to accept a detachable magazine.’

61. The Federal AWB list of “named” firearms (specific models) (Part A of the above definition) and their “copies or duplicates” can be described as the “named firearms” list. The firearms defined by review of their features were banned based on an evaluation that has often been called the “features” test. Because of the conjunction “and” in the statute, both the named firearms (together their copies or duplicates) and firearms with certain features were banned.

62. Subsequent to the passage of the Federal Assault Weapons Ban, Firearm Manufacturers and importers implemented modifications to a number of their firearms that were now banned under the “features test”. The majority of these modifications were of a cosmetic nature only in order to pass the features test. For example, features of a “pre ban” Colt AR-15 Rifle could easily be removed/modified to meet the features test by removal of the bayonet lug, affixing a non-folding / collapsible or “fixed” shoulder stock, removal of the flash hider and removal of any attachment to accommodate a grenade launcher. Modifications such as these had no appreciable effect on the operation and performance specifications of banned firearms in terms of ammunition capacity, accuracy, semiautomatic rate of fire, effective range, potential muzzle velocity of projectiles etc.

63. The larger crime reduction bill included a sunset provision for the AWB wherein the restrictions on named firearms, and those subject to the ban based on features, would expire in September 2004 unless extended by subsequent legislation. The Federal AWB expired in September of 2004 and was not replaced or renewed by any subsequent Congressional legislation.

64. In 1998 the Commonwealth of Massachusetts passed a Statewide Assault Weapons Ban that essentially mirrored the Federal legislation. The statewide ban was renewed in 2004 and has been in force at all times since.

65. For the purposes of this report, and the case at hand, it is important to emphasize two provisions in the Commonwealth’s legislation. First, as with the Federal AWB, it contains a list of “enumerated” (by make and model) banned firearms. Second, the Commonwealth statute also bans “copies or duplicates” of those same specific enumerated firearms. Third, state law also bans firearms that meet the features test which incorporates the same characteristics as had been present in federal law.

66. Since the passage of the Commonwealth’s AWB manufacturers have marketed cosmetically reconfigured banned firearms. Removal or modification of features (subject to the features test) resulted in firearms being produced and

marketed as so called “Massachusetts Compliant.” In doing so, manufacturers implied that the weapons were legal in Massachusetts because they were not banned under the features test, irrespective of the degree of similarity between the weapon and an enumerated banned firearm.

67. Cosmetically reconfigured rifles, such as those marketed as “post ban” under the Federal AWB, or “Massachusetts Compliant” following the Commonwealth AWB, are (in terms of basic performance criteria) no different than “enumerated” models. Removal of any or all of the features (flash hider, telescoping stock, bayonet lug etc.) enumerated under the “features test” has no discernable effect on the functional capabilities of the rifle relative to the “enumerated” firearm.

68. In July 2016, the Commonwealth’s Attorney General issued an Enforcement Notice regarding the sale of copies or duplicates of named banned firearms. The notice also included guidance on how determinations will be made as to whether a firearm is considered a copy or duplicate and subject to restriction:

Guidance:

A weapon is a Copy or Duplicate and is therefore a prohibited Assault weapon if it meets one or both of the following tests and is 1) a semiautomatic rifle or handgun that was manufactured or subsequently configured with an ability to accept a detachable magazine, or 2) a semiautomatic shotgun.

1. *Similarity Test:* A weapon is a Copy or Duplicate if its internal functional components are substantially similar in construction and configuration to those of an Enumerated Weapon. Under this test, a weapon is a Copy or Duplicate, for example, if the operating system and firing mechanism of the weapon are based on or otherwise substantially similar to one of the Enumerated Weapons.

2. *Interchangeability Test:* A weapon is a Copy or Duplicate if it has a receiver that is the same as or interchangeable with the receiver of an Enumerated Weapon. A receiver will be treated as the same as or interchangeable with the receiver on an Enumerated Weapon if it includes or accepts two or more operating components that are the same as or interchangeable with those of an Enumerated Weapon. Such operating components may include, but are not limited to: 1) the trigger

assembly; 2) the bolt carrier or bolt carrier group; 3) the charging handle; 4) the extractor or extractor assembly; or 5) the magazine port.

If a weapon meets one of the above tests, it is a Copy or Duplicate (and therefore a prohibited Assault weapon), even if it is marketed as “state compliant” or “Massachusetts compliant.”

The fact that a weapon is or has been marketed by the manufacturer on the basis that it is the same as or substantially similar to one or more Enumerated Weapons will be relevant to identifying whether the weapon is a Copy or Duplicate (and therefore a prohibited Assault weapon) under the applicable test(s).

Under Section 121, the Features Test in the former 18 U.S.C. section 921(a) (30) remains an independent basis for qualification as an Assault weapon.

If a weapon, as manufactured or originally assembled, is a Copy or Duplicate under one or both of the applicable tests, it remains a prohibited Assault weapon even if it is altered by the seller. Therefore, a Copy or Duplicate will be treated as an Assault weapon even if it is altered, for example, by pinning the folding or telescoping stock in a fixed position, by removing the pistol grip, by removing a bayonet mount or flash suppressor, or by preventing the weapon from accepting a detachable magazine.

Purely cosmetic similarities to an Enumerated Weapon, such as finish, appearance, or shape of the stock, or appearance or shape of the rail, will not be treated as relevant to a determination of whether a weapon is a Copy or Duplicate.

IX. OPINIONS

69. The Commonwealth’s Assault Weapons Ban prohibits firearms on two independent bases. It bans: (1) specifically enumerated Assault Weapons together with “copies or duplicates” of those weapons, and (2) weapons with two or more defined features.

70. The enumerated weapons as well as high capacity magazines are derived from weapons designed for military use in the 19th (in one case) or the 20th century.

71. Following the inception of the Commonwealth's legislation, manufacturers have followed the same practice they did following the passage of the Federal AWB. They represented to consumers that relying on the "features test" to determine what could be lawfully sold or transferred in the Commonwealth superseded evaluation of whether certain weapons were copies or duplicates of banned firearms. Based on this position, manufacturers erroneously claimed they were offering "Massachusetts Compliant" versions of enumerated weapons.

72. When viewed in light of two tests delineated in the Enforcement Notice many firearms marketed as Massachusetts Complaint are, in reality, "copies or duplicates" of enumerated banned firearms. Numerous parts and assemblies (in both AR, AK and other named weapons) are completely interchangeable between both types (enumerated and "Massachusetts Compliant") weapons produced by the same manufacturer. Many of the internal parts in named weapons have no other crossover applications for use in non-banned weapons. For example, a bolt carrier for a Colt A-15 is not used in any other type of firearm other than a AR-15 (or AR-15 type pistol) or a "copy or duplicate" of same.

73. Additionally, due to the standardized specifications of most of their components throughout the years, these parts can also be interchanged between similar type rifles from different manufacturers. During my tenure at the ATF National Firearms Examiner Academy I was responsible for the Academy's Firearm Reference Collection. Some of these firearms were heavily used / fired during the course of training and in order to keep them serviceable I was often required to repair or replace component parts. For example, I have personally replaced a Colt manufactured AR bolt carrier with one manufactured by Bushmaster (at the time a Wyndham ME manufacturer of AR-15 copies or duplicates) and the firearm functioned as designed without any issues. I have also replaced original Soviet era AK Bolt carriers, gas pistons and bolt assemblies with interchangeable parts manufactured by other (former) eastern bloc manufacturers and these rifles were fully functional afterwards. Viewed in light of the Commonwealth's AWB and Enforcement Notice I had essentially repaired enumerated weapons with parts and assemblies from "copies or duplicates".

74. While copies of the AR-15 and the AK-47 are the most prevalent in the United States, other statutorily enumerated weapons can also be replicated. Parts kits and receivers to build other enumerated weapons are available.

75. Although they not "identical" in terms of outward cosmetic appearance (due to removal / modification of features), firearms based on a common weapons design may be considered copies or duplicates when subject to tests such as those promulgated in the Enforcement Notice.

76. As stated previously the general performance characteristics and specifications, such as potential muzzle velocity, rate of fire, and ammunition capacity, are identical whether the specific firearm is a named firearm or a "copy" or "duplicate". Accordingly, it is my opinion that the intent of restricting both named firearms, and copies of those firearms, under the Commonwealth's AWB was meant to address their shared performance specifications.

77. At numerous points throughout their complaint the Plaintiffs aver that self-defense is one of the primary reasons for purchase of a banned firearm (without any supportive statistical data). It is my opinion that an AR, AK or other banned assault rifle is a poor choice for this task.

78. I have been asked on numerous occasions during my career what I would recommend for home or self-defense. My recommendation is based upon my inquiry in return regarding the individual's (and their family members') personal experience and comfort level with firearms. In over 25-plus years I have never recommended an AR, AK or other similar assault rifle as a home defense weapon.

79. Home defense and / or self-defense situations are rarely, if ever, lengthy shootouts at long ranges with extensive exchanges of gunfire. Banned assault weapons were designed to be effective at battlefield ranges of up to 500 yards. The typical muzzle velocity of a .223 caliber bullet is 3,200 feet per second (plus or minus). Common muzzle velocities for 9mm or .38 caliber handgun bullets are less than half of that. Projectiles travelling at velocities found in banned weapons pose a serious risk of over-penetration in most home construction materials such as gypsum board / sheet rock, and typical 2x4 lumber.

In reference to the NRA American Rifleman article mentioned in paragraph 20(b) the current U.S. Army issue .223 caliber ammunition is capable of penetrating 3/8" hardened steel at 350 yards. Potential over-penetration in a confined environment

is problematic in terms of risk to bystanders or family members outside the target location. Most jacketed commercially available 5.56mm ammunition has impressive capabilities in this regard. Additionally, the (former) NATO issue M855 SS109 5.56mm is available for purchase by civilians. This ammunition was designed to penetrate up to 3mm of “soft”, (non-hardened) steel.

In August 2014 the National Rifle Association’s “American Rifleman” published an article by Stanton Wormley: “The AR-15 for Home Defense: Penetration Tests”.

<https://www.americanrifleman.org/articles/2014/8/5/the-ar-15-for-home-defense-penetration-tests/>

Wormley conducted penetration tests on nine different types of .223 / 5.56mm ammunition by firing them through simulated wall sections constructed of gypsum board / sheet rock and wooden 2x4 studs. When fired at a 90-degree angle to the walls all nine (including “frangible” rounds designed to disintegrate when hitting a hard surface) easily penetrated the wall section as well as water jugs placed three feet behind:

“But just how much energy did the penetrating projectiles carry? All the loads, including the Glaser, exploded one-gallon water jugs placed 3 feet behind the wall sections.”⁵

The tests conducted by Wormley also included firing longitudinally through the wall sections resulting in the penetration of three successive 2” thick 2x4 studs by a number of the projectiles. These tests vividly highlight the inherent dangers of utilizing assault weapons with high velocity ammunition in a home defense scenario.

80. During a stressful situation such as a home invasion or break in there may be multiple steps required by the operator to bring the weapon from a safe condition to a firing condition. Manipulation of a charging handle, safety switch,

⁵ <https://www.americanrifleman.org/articles/2014/8/5/the-ar-15-for-home-defense-penetration-tests/>

inserting a magazine may be difficult to accomplish under stress, particularly if the operator has not adequately trained or practiced with their firearm. Other family members may not be familiar with bringing the weapon to a firing condition or fail to complete adequate steps to do so under stress.

81. While employed as a Special Agent with ATF the agency transitioned to an AR type rifle in the early 2000's. Each Agent was required to attend, and successfully complete, a one week / 40 plus hour transition training class in order to familiarize themselves with the weapon. The training included numerous live fire drills under stressful conditions. Additionally, we were required to requalify with these firearms quarterly and repeat the same drills as during the initial transition training. Nonetheless some Agents would make errors during those drills, although they had performed them repeatedly under stress, that resulted in a failure of the weapon to fire.

In my opinion many owners of banned weapons with the intent to utilize them in a home / self- defense scenario do not have the opportunity to train intensively nor regularly.

82. In my opinion, based upon my training, knowledge, experience and research, assault rifles were not designed for traditional hunting purposes. Neither was the .223 caliber cartridge developed for civilian hunting applications. Another factor to consider is whether there is a need for a fully loaded 30 round detachable magazine to hunt deer, boar etc., and is such a capacity even considered "sporting"? There are numerous other traditional sporting rifles (and in fact military surplus rifles such as the M1 Garand) that are not banned in the Commonwealth and are chambered in a caliber more suitable for hunting than .223 caliber / 5.56.mm.

83. In terms of home defense and personal protection I am of the opinion that Assault Weapons, whether in the form of a rifle or a handgun are a poor choice for either purpose.

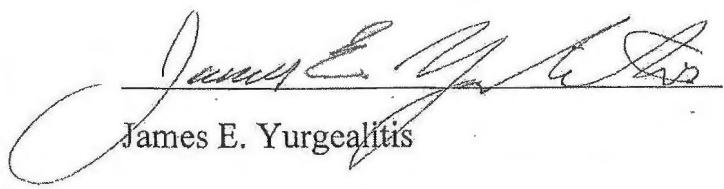
84. I have reviewed three years (2010 – 2013) of news clips as posted on the National Rifle Association's "Armed Citizen" Webpages. None of the news clips have mentioned a situation wherein there was a protracted lengthy shootout, for which a high capacity magazine would have been necessary. I am not of the opinion that an abundance of ammunition is a substitute for weapons familiarization and shot placement. Repeated practice and shooting with your chosen firearm will make you a more effective deterrent should deadly force be required.

85. If the individual had a preference for shoulder weapons, I have recommended a pump action 12-gauge shotgun (Remington 870, Mossberg 500 etc.) loaded and stored with the "hammer dropped" on an empty chamber, safety off. The only action required to bring the shotgun from a safe unloaded condition to a firing condition is to work the pump action of the shotgun. The advantages of this type of firearm and storage condition are unmatched stopping power, low probability of over penetration (as compared to rifle caliber and velocity projectiles) and little manipulation of safety mechanisms required in a high-stress situation. The loading / chambering process itself is an audible deterrent. Training and familiarization with this type of a firearm is simple and straightforward.

86. For a handgun, my first inclination is to recommend an eight shot revolver in .38 caliber or .357 Magnum (Similar to S&W Model 627, Taurus Model 608, etc.) loaded with hollow point bullets. As with my rationale for recommending a pump action shotgun there are no complicated safety mechanisms to manipulate in a high stress situation, low probability of over penetration and ease of reloading with a speed loader should more than eight shots be required. Revolvers are also easier and less complicated for other family members to learn to operate especially if they have less familiarity with firearms.

87. In terms of a carry handgun, I value concealability over ammunition capacity. The advantage of concealed carry is protection without broadcasting the fact. In a street robbery scenario, I believe the best course of action is to quickly extricate yourself from the "kill zone" and not engage in a protracted gunfight. When I was employed as a Special Agent with ATF we were issued a Sig Sauer P229 in .40 S&W caliber as a primary duty weapon. We were also given the choice of a Sig Sauer P239 in .40 S&W or a five shot Smith and Wesson Model 640 in .357 Magnum as a backup firearm. When off duty I carried the S&W 640 and a speed loader extensively as opposed to the P229. I found it easy to conceal and am of the opinion that ten (10) rounds was an adequate amount of ammunition to enable me, or myself and my child, to extricate myself from a street or retail location robbery should I encounter one. Consequently, I have most often recommended either a lightweight small revolver (S&W Bodyguard, Ruger LCR, Smith and Wesson Model 36, 640 or variant) carried with a speed loader or a low profile small semiautomatic pistol (Sig Sauer P236, Ruger LCP, Colt Pocketlite etc.) with a spare magazine.

Signed and Attested to this 20th day of September, 2017,



A handwritten signature in black ink, appearing to read "James E. Yurgealitis". The signature is fluid and cursive, with a horizontal line underneath it.

James E. Yurgealitis

James E. Yurgealitis

P.O. Box Redacted Maryland 21030
24 Hour Mobile: Redacted
Email: Redacted Personal
Information

SUMMARY:

Self employed as a Legal and Public Policy Consultant providing Technical Firearms and Forensic Consulting, Testing and Policy Research / Training Services to Corporations, Legal Counsel and the Public Sector

EDUCATION:

B.A., Political Science and Psychology, St. John Fisher College, Rochester, New York – May 1985

PROFESSIONAL EXPERIENCE:

December 2012 to Present: Independent Legal and Policy Consultant / Subject Matter Expert

Currently provide independent consulting services to Corporations, Legal Counsel and Governmental entities in regard to Public Policy and Technical matters relating to Firearms, Firearms Policy, Forensics and Law Enforcement. Current and former clients include the Office of the District Attorney for Cook County Illinois, The City of Sunnyvale, California, The City of Highland Park, Illinois, The Office of the Attorney General for the Commonwealth of Massachusetts and the Center for American Progress, Washington D.C. I have provided sound policy and technical assistance for my clients to include expert testimony which successfully endured the opposition's legal appeals to the U.S. Circuit Court of Appeals and the U.S. Supreme Court.

December 2003 to December 2012: Senior Special Agent / Program Manager for Forensic Services ATF National Laboratory Center (NLC), Beltsville, Maryland. U. S Department of Justice, Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF)

Directed the administration and management of ATF's Forensic Training Programs to include the National Firearms Examiner Academy (NFEA) a 12-month training program for State and Local Forensic Firearm Examiner Trainees. Also managed two additional forensic training programs. Administered a \$1M + budget in accordance with strict ATF and National Institute of Justice (NIJ) guidelines and reporting requirements. Responsible for oversight of all Forensic Firearms related research at the NLC. Supervised a full and part time cadre of fifty-two (52) instructors and administrative personnel. Maintained liaison with commercial firearms and ammunition manufacturers and subject matter experts and ensure that lesson plans and curriculum reflected the latest technical developments in firearms manufacture, forensics and their application to federal and state law. Applied for, received and managed in excess of \$2M in external grants to facilitate uninterrupted delivery of training during internal budget shortfalls. Detailed to the Department of Homeland Security Command Center in 2005 with overall responsibility to coordinate and direct Federal, State and Local Law Enforcement assets during and following Hurricanes "Irene" and "Katrina" and again in 2010 for "Andrew" and "Danielle".

June 1997 - December 2003: Special Agent / Violent Crime Coordinator, ATF Baltimore Field Division, Baltimore, Maryland

Responsible for management of ATF's "Project Disarm", a joint law enforcement initiative between ATF, The United States Attorney's office for the District of Maryland (USAO), the Baltimore City Police Department, the Baltimore City States Attorney's Office and the Maryland State Police. Duties included reviewing over 400 state and local firearms related arrests annually for subsequent referral to the USAO and Federal Prosecution. Managed a caseload of 75 – 100 criminal cases annually. Responsible for selection, referral, follow - up investigation and subsequent indictment and prosecution of armed career criminals. Testified in front of Federal Grand Juries in excess of 75 times annually. Was recognized, and testified, as an expert witness in the Identification, Operability and origin of Firearms and Ammunition in three Federal Judicial Districts. Toured over 25 firearms and ammunition manufacturing facilities in Europe and the United States.

June 1990 – June 1997:

Special Agent, ATF Baltimore Field Division, Baltimore, Maryland

Served in various capacities as a street-level Special Agent. Acted as Group Supervisor and Assistant Special Agent in Charge on numerous occasions. Served on the Washington – Baltimore High Intensity Drug Trafficking Area (HIDTA) task force from 1995 – 1999. Investigated armed narcotics trafficking organizations, seized assets, authored and executed Federal and state search and arrest warrants, conducted surveillance, interviews / interrogations, testified in Federal and state courts as a fact witness, purchased firearms, explosives and narcotics while in an undercover capacity, investigated fatal bombings and arsons, firearms trafficking, alcohol and tobacco trafficking, homicide, fraud and gun store burglaries. Also while detailed for 8 months as the Public Information Officer authored press releases, provided interviews to local and national print and television media outlets and made presentations to local and national public and special interest groups and associations.

April 1989 – June 1990 and July 1986 – March 1987: Special Agent, United States Department of State, Diplomatic Security Service (DSS), Washington Field Office, Rosslyn, VA

Conducted investigations of violations of Federal Law under the department's purview to include Passport and Visa Fraud, Illegal trafficking of restricted firearms and war materials to prohibited countries, human trafficking, seized assets, authored and executed State, local and Federal Arrest and Search Warrants, testified in Federal Court as a fact witness, detailed on an as needed basis to the Dignitary Protection Division as Agent in Charge of multiple protective details for visiting and resident foreign dignitaries, temporarily assigned to support Physical and Personal Protective Security in various U.S. Embassies overseas on an as needed basis, detailed to the Secretary of State Protective Division on an as needed basis to supervise agents assigned to augment the permanent protective detail.

March 1987-February 1989: Special Agent, DSS, Secretary of State Protective Division, Washington, DC

Served in various capacities as Acting Agent in Charge, Acting Shift Leader, Lead Advance Agent and Shift Agent. Responsibilities included close personal protection of the Secretary of State both domestically and overseas, extensive foreign travel to facilitate and prepare security arrangements for overseas visits to include Presidential Summit meetings, liaison with foreign host government officials to plan and solicit assistance with security arrangements, supervision of agents temporarily assigned to augment the detail, liaison with U.S Government Intelligence Agencies and other Federal, State and Local Law Enforcement Agencies to identify and protect against potential threats to the Secretary of State.

CLEARANCES: Top Secret March 1986 valid through February 2015. Numerous prior SCI Clearances.

TEACHING EXPERIENCE:

- Instructed at the Federal Law Enforcement Training Center (FLETC), for ATF and other Federal Law Enforcement Agencies
- Instructed at the International Law Enforcement Academy (ILEA) in Budapest, Hungary
- Instructed for numerous State, local and / or regional law enforcement agencies both in the United States, Canada and Central America

LINKEDIN PROFILE AND ENDORSEMENTS:

https://www.linkedin.com/in/james-jim-yurgealitis-68618464?trk=nav_responsive_tab_profile_pic

REFERENCES:

Available upon request

**Professional Qualifications of James E. Yurgealitis
Independent Legal and Forensic Consultant**

I, James E. Yurgealitis, being duly sworn, depose and state:

- 1.) That I was previously employed as a Senior Special Agent / Program Manager with the Bureau of Alcohol, Tobacco Firearms & Explosives, (ATF) United States Department of Justice, and had been so employed since 1990. Prior to 1990 I was employed as a Special Agent with the Bureau of Diplomatic Security, (DSS) United States Department of State and had been so employed since 1986.
- 2.) I have a Bachelor of Arts Degree in Political Science and Psychology from St. John Fisher College, Rochester, New York.
- 3.) I am a graduate of the Federal Law Enforcement Training Center, Glynco, Georgia, the Criminal Investigator Training Program, Bureau of Diplomatic Security New Agent Training, and the Bureau of ATF New Agent Training Program.
- 4.) I have completed the Firearms Interstate Nexus Training Program conducted by the Firearms Technology Branch, ATF Headquarters, Washington, D.C.
- 5.) I have completed both Advanced Interstate and European Nexus Training conducted by ATF in conjunction with several domestic and European firearm manufacturers.
- 6.) I have testified in excess of 200 times before Federal Grand Juries regarding the classification, operability, and commerce of firearms and / or ammunition.
- 7.) I have previously qualified as an expert witness regarding the origin, operability / classification and interstate movement of firearms and ammunition in U.S. District Court for the District of Maryland, U.S. District Court for the District of Delaware and the Circuit Court For Baltimore City, Maryland.
- 8.) I have conducted regular training for local, state and federal law enforcement agencies both domestically and overseas regarding firearms classification, operability and firearms statutes.
- 9.) I maintain a personal library of books, printed material and documents that relate to the field of firearms, ammunition, and firearms classification, attend local and national trade shows and professional association meetings, and regularly review periodicals relating to firearms and ammunition.
- 10.) I attend trade shows, maintain contact with, and regularly consult with other persons, to include published authors and recognized experts in the origin, identification and classification of firearms and ammunition.
- 11.) I have, during my tenure with ATF, personally examined in excess of five thousand

Qualifications Of James E. Yurgealitis contd.

firearms to determine their origin and classification and operability, and to facilitate the tracing of those firearms.

I have toured production facilities for numerous firearms and ammunition manufacturers. The tours were conducted by corporate historians, corporate officers, or production engineering personnel.

Domestic Firearm Manufacturers:

Bushmaster Firearms, Ilion, NY, USA
Colt, New Haven CT, USA (4x)
H&R 1871 Inc., Chicopee, MA, USA (2x)
Marlin, North Haven CT, USA (4x)
O.F. Mossberg & Sons, North Haven, CT, USA (4x)
Remington Firearms, Ilion, NY, USA
Savage Arms Inc., Westfield, MA, USA (4x)
Sig-Sauer / SIGARMS Inc., Exeter, NH, USA (3x)
Smith and Wesson, Springfield, MA, USA (4x)
Sturm Ruger, Newport, NH, USA (4x)
Yankee Hill Machining, Florence, MA, USA

Foreign Firearm Manufacturers:

Carl Walther GmbH, Ulm, Germany
Ceska Zbrojovka (CZ), Uhersky Brod, Czech Republic
Fegarmacy (FEG), Budapest, Hungary
F.N Herstal S.A., Herstal, Belgium
Glock GmbH, Deutsch-Wagram, Austria
Heckler & Koch GmbH, Oberndorf au Neckar, Germany
J.P. Sauer & Sohn GmbH, Eckernforde, Germany

Domestic Ammunition Manufacturers:

Fiocchi Ammunition, Ozark, MO, USA
PMC, Boulder City, NV, USA
Remington, Lonoke, AR, USA (4x)
Sierra, Sedalia, MO, USA
Starline Brass, Sedalia, MO, USA

European Proof Houses

Beschussamt Ulm, (Ulm Proofhouse) Ulm, Germany
Beschusstelle Eckernforde, (Eckernforde Proofhouse) Eckernforde, Germany
Czech Republic Proofhouse, Uhersky Brod, Czech Republic
Liege Proofhouse, Liege, Belgium

Qualifications Of James E. Yurgealitis contd.

I have been allowed regular access to the following reference collections:

Bureau of Alcohol, Tobacco Firearms and Explosives Reference Collection, Martinsburg, West Virginia, USA consisting of 5,000+ firearms

Liege Proofhouse, Liege, Belgium consisting of 1,000+ ammunition cartridges

Springfield Armory National Historic Site Firearms Collection, Springfield, MA, USA consisting of 10,000+ Firearms

Smithsonian Institution (Museum of American History) Firearms Reference Collection Washington, DC, USA, consisting of 4000+ firearms

Wertechnische Studiensammlung des BWB, (Federal Defense Procurement Bureau Museum) Koblenz, Germany consisting of 10,000+ Firearms

I have toured the following museums:

Heeresgeschichtliches Museum, (Museum of Military History), Vienna, Austria

Hungarian Military Museum, Budapest, Hungary

Springfield Armory National Historic Site, Springfield, MA, USA

United States Air Force Museum, Dayton, OH, USA

United States Army Ordnance Museum, Aberdeen Proving Ground, Aberdeen, MD, USA

United States Military Academy Museum, West Point, NY, USA

United States Naval Academy Museum, Annapolis, MD, USA

Wertechnische Studiensammlung des BWB, (Federal Defense Procurement Bureau Museum) Koblenz, Germany

Membership in Professional Organizations:

Member, International Ammunition Association (IAA)

Technical Advisor (pending approval), Association of Firearm and Toolmark Examiners (AFTE)

Member, Federal Law Enforcement Officers Association (FLEOA)

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Poyer, Joe, *The AK-47 and AK-74 Kalashnikov Rifles and Their Variations*, North Cape Publications, Tustin, CA, 2004

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"Brownells Releases AR-15 Specialty Catalog #11", *brownells.com*, <http://www.brownells.com/GunTech/Brownells-Releases-AR-15-Specialty-Catalog-11/detail.htm?lid=17122>

Bartocci, Christopher, "AR-15/M16: The Rifle That Was Never Supposed to Be" July 16, 2012, Gun Digest, <https://gundigest.com/reviews/the-ar-16m16-the-rifle-that-was-never-supposed-to-be>

Court Filings:

Complaint and Answer, *Worman v. Baker* (District of Massachusetts)

Declaration of Christopher S. Koper, *Kolbe v. O'Malley* (District of Maryland)